

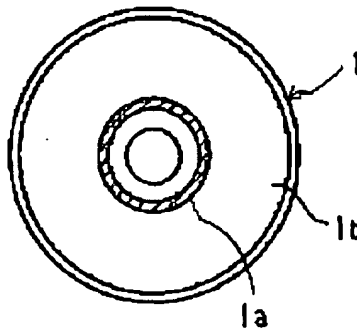
INFORMATION RECORDER/REPRODUCER

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Abstract of JP7121987

PURPOSE: To arbitrarily edit while protecting a copyright by recording desired main information reproduced from a first recording medium on a desired area of a second recording medium and erasing main information which is digitally copied.

CONSTITUTION: A magneto-optic disk 1 as a rewritable optical disk has a TOC area 1a of a managing information area on its inner peripheral side end, and a main information area 1b at a most area outside the area 1a. The area 1b records music information, while the area 1a records additional information regarding information recorded on the area 1b such as a starting absolute address position and a finishing absolute address, etc., of a music number of each information. Thus, finally retained audio information becomes a mode moving between recording media to prevent presence of the same content on a plurality of the media and to protect its copyright.



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CLAIMS

[Claim(s)]

[Claim 1] A playback means to be an information record regenerative apparatus using the record medium with which the information which forbids a digital copy was included, and to reproduce the request information on the 1st record medium, The information record regenerative apparatus characterized by having the deletion means which deletes information on the 1st record medium corresponding to a record means to record the output of a playback means on the request location on the 2nd record medium, and the information, to which it reproduces from the 1st record medium and record to the 2nd record medium is carried out.

[Claim 2] The 1st record medium and the 2nd record medium are an information record regenerative apparatus according to claim 1 characterized by being the record medium which consists of a main information field where the main information, such as an audio and an image, is recorded, and a management information field where the management information in which the record positional information for every main information is included with the information which forbids a digital copy is recorded.

[Claim 3] until the deletion actuation by the deletion means is completed -- the 1st record medium -- and -- or the information record regenerative apparatus according to claim 1 characterized by having a means to forbid the discharge from the information record regenerative apparatus of the 2nd record medium.

[Translation done.]

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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to the information record regenerative apparatus using the record medium which the digitized audio signal etc. can record on arbitration, for example, a recordable compact disk.

[0002]

[Description of the Prior Art] Conventionally, the so-called compact disk (hereafter referred to as CD) with which continuation information, such as music information, was optically recorded by the detectable minute pit as a digital signal is used widely. As for CD, playback is performed by the optical disk regenerative apparatus only for playbacks (CD player).

[0003] Drawing 8 and drawing 9 are the schematic drawing for explaining the format used with CD. As shown in drawing 8, one frame (101a) of a record signal is constituted by the frame alignment signal (101b) which shows the head of a frame, the sub-code (101c) which shows the additional information of the main information, and the data field (101d) which added the parity code for error detection correction to the 24-byte data which are the main information. In addition, a data field (101d) consists of error detection correction methods which combined the interleave called CIRC (Cross Interleave Reed Solomon Code). moreover, as shown in drawing 9, as for a sub-code (101c), the above-mentioned frame accomplishes one subcoding frame (102c) (it is also hereafter called a sector) by 98 pieces, and the absolute-address information on a track number (the main information -- a sound -- called a tune number number when easy), and a disk etc. is shown. Since the die length of the above-mentioned sector is a second (1/75), it had been 1 second with the sector of 75, and the sector number has constituted the continuous hour entry and the positional information which carry out a sequential increment from the inner circumference side of a disk as address information (frames are 75 **) of a part:second:frame.

[0004] Drawing 7 is the mimetic diagram showing the field arrangement on the disk in CD.

[0005] The main information record section where the sector number (absolute address) according [a disk (100a)] to the main information and sub-codes, such as music information, is contained (100c), The additional information about each main information recorded on the above-mentioned main information record section (100c), for example, each track number, and the recording start sector number of each truck, the truck -- audio information, such as music, -- or it consists of TOC (Toble Of Contents) fields (100b) where the information which shows prohibition or authorization of the information and the digital copy which identify the data for computers is shown by the sub-code. By the above-mentioned format, by reading the sub-code information on the above-mentioned TOC field (100b) in a CD player at the time of loading of a disk The number of each main information (equivalent to the number of music in the case of music information), and the sector number of the recording start location, When an informational classification (an audio or data) is recognized and playback of a desired truck collates the sector number by the information on a TOC field (100b), and the sub-code of the main information record section (100c) to future playback directions, it performs promptly with access actuation.

[0006] Since these CDs are recorded by the constant linear velocity and the so-called CLV (Constant Linear Volocity) method at the time of record, its recording density is fixed in every

location on a disk, and they have attained improvement in storage capacity. In an actual CD player, CLV control is performed by performing the roll control of a disk so that spacing of the regenerative signal of CD by which CLV record was carried out by the above-mentioned signal format, for example, a frame alignment signal, may serve as criteria length.

[0007] On the other hand, in case it is used recording various information, such as music information and computer information, on the disk of rewritable molds, such as a magneto-optic disk with which development is furthered in recent years, it is desirable to offer the disk record regenerative apparatus which communalizes a playback system between the conventional CDs and has compatibility.

[0008] Since [, such as a frame alignment signal used for the absolute-address information and CLV control using the sub-code by the signal format of Above CD,] it does not exist at all, it becomes impossible in this case, to perform access actuation to the arbitration sector location before record, and CLV control required also during record in the initial disk which is not recording especially information. Then, the thing which is the absolute-address information and equivalence by said sub-code and which after a biphasic mark modulation and each bit make disk radial the inside or an outside deflect the guide rail of an optical disk for the absolute address as a recording method of the address according to "1" and "0" absolutely, or changed the width of face of a guide rail is proposed. (Refer to JP,64-39632,A)

In that case, if the frequency band of the absolute address by the biphasic mark modulation and the frequency band of the recording information by the EFM (Eight to Fourteen Modulation) modulation are made different, it is possible to separate both of each other and to reproduce, and access actuation is possible using the above-mentioned absolute address using the guide rail also to the field without recording information. Moreover, by using the playback carrier component of the above-mentioned absolute address also about CLV control, exact CLV control can be performed and it can carry out similarly during record.

[0009] By realizing CD in which such record is possible, the digital audio information from the usual CD player is connected through a D/A converter and an A/D converter, and the so-called digital copy without debasement becomes possible at a user level.

[0010]

[Problem(s) to be Solved by the Invention] While it is technically easy about the above-mentioned digital copy, when this is made to permit without any restriction, since there is a problem socially, from the standpoint from which the copyright of a music title is protected, it is at the phase where opt for the regulation actually called SCMS (Serial Copy Management System), and operation is started. As for a digital copy, this SCMS permits only the 1st generation (namely, only in case of once), and the digital copy of the 2nd henceforth protects a music title implementer's copyright by making it forbid within audio equipment.

[0011] However, according to Above SCMS, a digital copy is made only once in treatment with the same said of that in which the user himself did analog recording using the microphone etc., but although he holds copyright, the irrational situation where edit using a digital copy without debasement cannot be performed generates it.

[0012] Moreover, even when only the music of hope was chosen from the record medium which carried out the digital copy from CD etc. and edit record was performed to another record medium, since a digital copy was not made, it had the demerit which will carry out by the analog copy and cannot receive the benefit of digital storage.

[0013]

[Means for Solving the Problem] A playback means to be an information record regenerative apparatus using the record medium with which the information which forbids a digital copy was included in order that the information record regenerative apparatus concerning this invention might solve an above-mentioned technical-problem point, and to reproduce the request information on the 1st record medium, It is the configuration characterized by having the deletion means which deletes information on the 1st record medium corresponding to a record means to record the output of a playback means on the request location on the 2nd record medium, and the information, to which it reproduces from the 1st record medium and record to the 2nd record medium is carried out.

[0014] In addition, it is suitable to use the record medium which consists of a main information field where the main information, such as an audio and an image, is recorded as the 1st record medium of the above and the 2nd record medium, and a management information field where the management information in which the record positional information for every main information is included with the information which forbids a digital copy is recorded.

[0015] furthermore -- until the deletion actuation by the deletion means is completed -- the 1st record medium -- and -- or it is desirable to consider as the configuration equipped with a means to forbid the discharge from the information record regenerative apparatus of the 2nd record medium.

[0016]

[Function] In the information record regenerative apparatus concerning this invention, while the digital copy recorded on the request field of the 2nd record medium while the main information on the request reproduced from the 1st record medium has been digital information is performed, edit actuation of arbitration is attained by carrying out elimination of the main information to which the digital copy was performed, protecting copyright. Moreover, since elimination of the above-mentioned main information is carried out about management information by using the record medium which consists of a main information field where the main information, such as an audio and an image, is recorded, and a management-information field where the management information in which the record positional information for every main information is included with the information which forbids a digital copy is recorded as the 1st record medium of the above, and the 2nd record medium, edit actuation of arbitration is carried out for a short time, protecting copyright.

[0017] in addition -- before starting sound recording actuation in the above-mentioned actuation, until elimination actuation is completed -- the 1st record medium -- and -- or the discharge actuation from the information record regenerative apparatus of the 2nd record medium is forbidden, and it is prevented that the significant main information on the same contents exists in two or more record media.

[0018]

[Example] It will be as follows if one example at the time of applying this invention to the disk record regenerative apparatus using a rewritable mold disk is explained based on drawing 1 thru/or drawing 6 . As shown in drawing 2 , while the TOC field (1a) which is a management information field is established in the inner circumference side edge section, let the field of most outsides of a TOC field (1a) be the main information field (1b) at the magneto-optic disk (1) as an optical disk of a rewritable mold. While music information is recorded, a tune number number, an initiation absolute-address location, a termination absolute-address location, etc. for every additional information about each information recorded on the main information field (1b), for example, information, are recorded on a TOC field (1a) by the main information field (1b). Moreover, as shown in drawing 3 , beforehand, a spiral guide rail (2-2 ...) (hatching shows for convenience) separates predetermined spacing to the disk radial, and is formed in the TOC field (1a) and the main information field (1b) in a magneto-optic disk (1). And the absolute address on a disk is deflected for the guide rail (2-2 ...) by the radial inside or the radial outside of a magneto-optic disk (1) corresponding to after a biphasic mark modulation, whether it is "1", or it is "0." In addition, the above-mentioned absolute address serves as prior recording information as roll control information on CLV, while expressing the location on a disk. Moreover, since the absolute address here corresponds with 1 sector in said CD format, it will also be hereafter called a sector.

[0019] Drawing 1 is the block diagram showing one example at the time of applying the information record regenerative apparatus concerning this invention to a disk record regenerative apparatus.

[0020] The disk record regenerative apparatus concerning this example is equipped with a unit (A) and a unit (B) as equipment which performs sound recording playback. While each unit can output and input audio information to the exterior It is constituted so that the audio information reproduced from a unit (A) corresponding to the case where the digital copy between record media is performed can be recorded in a unit (B) with digital information, and it is constituted so

that each unit may be organically controlled by the controller (10). Since each unit is equipped with the common component, it attaches the name same about the same component for convenience in the following explanation, and distinguishes and explains it by the number. At magneto-optic-disk (1) spindle motor [which is rotated in support of / (22)] (4)/(24) with which it is loaded by loading device (35)/(36), and the time of playback, the laser beam was irradiated at / (22) and the disk record regenerative apparatus concerning this example is equipped with magneto-optic-disk (1) head [light / which reads recording information] (3)/(23). Optical head (3) While the signal reproduced by / (23) is amplified by playback amplifier (5)/(25) and the optical MAG signal made binary is supplied to playback data-processing circuit (9)/(29), said prior recording information is sent to recording information detector (6)/(26). Recording information detector (6) / (26) is constituted by a band-pass filter and PLL, and the clock which synchronized by PLL is generated to the prior recording information in the regenerative signal extracted with the band-pass filter. And the clock which synchronized with the above-mentioned prior recording information which consists of a biphasic mark modulation of absolute-address information is supplied to CLV control circuit (7)/(27). CLV control circuit (7) In / (27), the above-mentioned synchronous clock from recording information detector (6)/(26) is compared with the reference frequency held inside, and exact CLV control is carried out by controlling spindle motor (4)/(24) by the difference signal. Moreover, the prior recording information in the regenerative signal extracted by recording information detector (6)/(26) is supplied to address detector (8)/(28). Address detector (8) / (28) consists of a biphasic mark demodulator circuit and an address decoder, after it performs the biphasic mark recovery of the prior recording information extracted by recording information detector (6)/(26), is decoded by the positional information on a disk, i.e., the absolute-address value which is a sector, by the address decoder, and is supplied to a controller (10). Playback data-processing circuit (9) In / (29), while performing separation and an EFM recovery of a frame alignment signal from the binary-ized light MAG signal in the regenerative signal supplied from playback amplifier (5)/(25), separating sub-code information and sending out to a controller (10), error correction actuation by CIRC using the parity of playback data is performed. Playback data-processing circuit (9) The playback data in which the error correction was carried out by / (29) are returned to an analog audio signal by the D/A (digital/analog) converter (15) through an electronic switch (14), and are outputted to the exterior as a terminal (16). Moreover, the playback audio data outputted from a playback data-processing circuit (9) side are supplied to an electronic switch (30).

[0021] On the other hand, after the analog audio information that it is inputted from a terminal (17) is changed into digital audio information by the A/D (analog to digital) converter (18), it is supplied to a record data-processing circuit (19) and an electronic switch (30).

[0022] Record data-processing circuit (19) In / (31), digital audio information from an A/D converter (18) In (record data-processing circuit (31 [however,]), parity ***** addition for error detection correction is performed in an A/D converter (18) or a playback data-processing circuit (it becomes the digital audio information from 9)) through an electronic switch (30). The sub-code information from a controller (10) is added, after eight-to-fourteen modulation, a frame alignment signal is added and coil driver (20)/(32) is supplied. Coil driver (20) / (32) drives coil (21)/(33) based on the supplied signal, and record of a signal is performed, when optical head (3)/(23) is irradiated by it and coincidence and the laser beam for record is irradiated by magneto-optic-disk (1)/(22). The signal format here is the same as that of the thing of CD used by said drawing 8 and drawing 9 , and explanation is omitted.

[0023] A controller (10) receives directions of the record rebirth of a user to unit (A)/(B) etc. through a control unit (12). Moreover, while recognizing the location to the disk field of optical head (3)/(23) in response to the absolute-address information (namely, sector value) from address detector (8)/(28), it has the accessing function which moves an optical head to a desired location using the optical head migration device which is not illustrated. Furthermore, while recognizing sub-code information given from playback data-processing circuit (9)/(29), when the recognized sub-codes are the contents of the TOC field, it is constituted so that it may be made to memorize as management information to TOC memory (11)/(34) and the readout of management information may be performed from TOC memory (11)/(34) if needed.

And when the main information is newly recorded, management information in TOC memory (11)/(34) is updated. Record is performed through the above-mentioned record procedure by reading the contents of TOC memory (11)/(34) and supplying record data-processing circuit (19)/(31) as management information on the occasion of record of management information. Moreover, the location of optical head (3)/(23) using the above-mentioned absolute-address information besides the operating state for every unit, i.e., record, a playback location, etc. are constituted by the display (13) so that it may be displayed serially if needed. Furthermore, to loading device (35)/(36), it is constituted so that prohibition and authorization directions of discharge actuation of magneto-optic-disk (1)/(22) may be performed.

[0024] Drawing 4 applies the information record regenerative apparatus concerning this invention to the disk record regenerative apparatus of drawing 1, is the flow chart of the processing control which made the subject the controller (10) in which one example in the case of performing the digital copy from a unit (A) to a unit (B) is shown, and explains it below as an example of a copy of the music information shown in drawing 5.

[0025] Drawing 5 is the example of music information arrangement of magneto-optic disk (1) / [before and after performing a digital copy] (22) top, and the hatching part in drawing means that significant music information does not exist.

[0026] (5a) is music information arrangement before the digital copy implementation in the magneto-optic disk (22) with which the loading device (36) of a unit (B) was loaded, and the 1st (BM1) music is arranged. Therefore, the contents of Table 1 are beforehand read from a magneto-optic disk (22) to the TOC memory (34) corresponding to a unit (B) as management information, and it memorizes.

[0027]

[Table 1]

曲番号	開始アドレス	終了アドレス
1	0 0分0 2秒0 0フレーム	0 5分3 4秒7 4フレーム

[0028] (5b) is music information arrangement before the digital copy implementation in the magneto-optic disk (1) with which the loading device (35) of a unit (A) was loaded, and the 1st (AM1) music thru/or the 4th (AM4) music are arranged, the contents of Table 2 are beforehand read from a magneto-optic disk (1) to the TOC memory (11) corresponding to a unit (A) as management information, and it is memorized.

[0029]

[Table 2]

曲番号	開始アドレス	終了アドレス
1	0 0分0 2秒0 0フレーム	0 8分1 3秒7 4フレーム
2	0 8分1 4秒0 0フレーム	1 5分0 9秒7 4フレーム
3	1 5分1 0秒0 0フレーム	2 6分2 6秒7 4フレーム
4	2 6分2 7秒0 0フレーム	3 2分5 7秒7 4フレーム

[0030] (5c) is music information arrangement after the digital copy implementation in the magneto-optic disk (1) of a unit (A) (namely, result of having performed a series of processings corresponding to a digital copy shown in drawing 4), and while the 3rd (AM3) music is deleted to (5b), it is shown that RINAN burring of that whose number was the 4th (AM4) is newly carried out as the 3rd (AM3') music.

[0031] And it is shown that are music information arrangement after the digital copy implementation in the magneto-optic disk (22) of a unit (B) (namely, result of having performed a series of processings corresponding to a digital copy shown in drawing 4), and the 2nd (BM2) (5d) music was newly added to (5a). Namely, the case where drawing 5 carries out the digital copy of the 3rd (AM3) music of a magneto-optic disk (1) as (BM2) from the head of the free area of a magneto-optic disk (22). Following (5a) (5b) the music information arrangement before and behind digital copy implementation is shown, the example of operation in the case of carrying out a digital copy to music information arrangement of an and (5d) from music information arrangement (5c) is explained using drawing 4. In addition, since it is the case where a digital

copy is performed, as data for sound recording of a unit (B), it is premised on the output of the playback data-processing circuit (9) which is the playback output of a unit (A) being connected as an input of a record data-processing circuit (31) through an electronic switch (30).

[0032] Controllers (10) are directions (it corresponds above) of a control unit (12) to a digital copy at (S1). If the case where the directions which copy the 3rd (AM3) music of a magneto-optic disk (1) to the free area of a magneto-optic disk (22) are given is given to an assumption The playback ending address (Ape is called hereafter) in a setup (S2) of the sound recording starting address (Ars is called hereafter) in a unit (B), a setup (S3) of the playback starting address (Aps is called hereafter) in a unit (A), and a unit (A) is set up (S4). If it is made to correspond to Table 1 and 2, (Ars) will serve as a free-area head of a magneto-optic disk (22). From Table 1 which is the contents of TOC memory (34), [00 frames (05 minutes and 35 seconds)] made into the next value of the ending address of the 1st music are given. Since the 3rd music of a magneto-optic disk (1) is reproduced, while [00 frames (15 minutes and 10 seconds)] which is the starting address of the 3rd music are given from Table 2 which is the contents of TOC memory (11), (Aps) [74 frames (26 minutes and 26 seconds)] which is the ending address of the 3rd music as (Ape) are given.

[0033] Next, after performing access actuation to the location (Aps) of an optical head (3) by (S5), access actuation to the location (Ars) of an optical head (23) is performed by (S6), and prohibition directions of ejection actuation, i.e., discharge actuation of magneto-optic-disk (1)/(22), are performed to loading device (35)/(36) by (S7). And while the playback actuation from the location (Aps) of a magneto-optic disk (1), i.e., playback of the 3rd (AM3) music, is started by the above-mentioned flow of operation by (S8) By starting the sound recording from the location (Ars) to a magneto-optic disk (22) by the above-mentioned flow of operation by (S9) the digital copy actuation which the contents of the 3rd (AM3) music of the magneto-optic disk (1) are reproduced, and is recorded as the 2nd (BM2) music of a magneto-optic disk (22) is started And Whether playback of a magneto-optic disk (1) of the 3rd (AM3) music was completed by (S10) desired music playback and here While it is judged from the absolute-address information on the magneto-optic disk (1) obtained from an address detector (8), it amounts to (S11) when request playback is completed by having exceeded (Ape), and terminating the playback actuation by the side of a unit (A) The sound recording actuation by the side of a unit (B) is terminated by (S12), and the sound recording ending-address value (Are is called hereafter) in the magneto-optic disk at that time (22) is acquired from an address detector (28).

[0034] Next, renewal of the management information in TOC memory (11) is performed by (S13).

[0035] Here, it is updated by the contents which deletion of the 3rd (AM3) music as shown for corresponding to the digital copy by the playback of the 3rd (AM3) music shown to the contents of Table 2 (5b) (5c) etc. is performed, and are shown in Table 3.

[0036]

[Table 3]

曲番号	開始アドレス	終了アドレス
1	0 0 分 0 2 秒 0 0 フレーム	0 8 分 1 3 秒 7 4 フレーム
2	0 8 分 1 4 秒 0 0 フレーム	1 5 分 0 9 秒 7 4 フレーム
3	2 6 分 2 7 秒 0 0 フレーム	3 2 分 5 7 秒 7 4 フレーム

[0037] That is, as shown in Table 3, the management information about the 3rd (AM3) music reproduced corresponding to digital copy actuation is deleted, and they carry out RINAN burring, using as the 3rd (AM3') music the contents registered as the 4th (AM4) music. And (S14) after making an optical head (3) access the TOC field of a magneto-optic disk (1), renewal of management information of the TOC field on a magneto-optic disk (1) is performed by recording the contents of the TOC memory (11) shown in Table 3 by (S15).

[0038] Renewal [in / at continuing / TOC memory (34) (S16)] of management information is performed.

[0039] Here, it corresponds to the new sound recording of the 2nd (BM2) music as shown to the

contents of Table 1 (5d), and is updated by the contents shown in Table 4.

[0040]

[Table 4]

曲番号	開始アドレス	終了アドレス
1	0 0 分 0 2 秒 0 0 フレーム	0 5 分 3 4 秒 7 4 フレーム
2	0 5 分 3 5 秒 0 0 フレーム	1 6 分 5 1 秒 7 4 フレーム

[0041] That is, as shown in Table 4, as a starting address of the 2nd music where the above (Ars) is new, (Are) is given as an ending address and added.

[0042] And by recording the contents of the TOC memory (34) shown in Table 4 by (S18), after making an optical head (23) access the TOC field of a magneto-optic disk (22) by (S17) After renewal of management information of the TOC field on a magneto-optic disk (22) was performed, Authorization directions of ejection actuation, i.e., discharge actuation of magneto-optic-disk (1)/(22), are performed to loading device (35)/(36) by (S19), future ejection actuation is enabled, and a series of actuation is ended by (S20).

[0043] The digital copy by controlling two or more units organically as mentioned above is carried out. By deleting the copied material information which copied in this digital copy actuation, the audio information finally left behind serves as a gestalt which moves between record media, and it is prevented that the same contents exist in two or more record media so that clearly from the above-mentioned example. Since discharge of the magneto-optic disk with which will set by the time the midst by which the digital copy is carried out, and copied material information are deleted, and the record regenerative apparatus of a disk is loaded is forbidden, an unjust digital copy (a record medium with two or more same contents is obtained) is prevented from the ability of a user not to control information deletion of a copied material intentionally by disk discharge. Moreover, although how to disconnect the power source of a disk record regenerative apparatus compulsorily etc. can be considered as an another means to perform said unjust digital copy intentionally when a digital copy is completed It is constituted so that existence of main information may be recognized by only the management information of the TOC field on each magneto-optic disk in the above-mentioned example. After performing the digital copy of audio information (S13) (S15), management information deletion of a copied material is performed. After that (S16) Or (S18) since management information registration of a copy place is performed, If it is before (S14) even if a power source is disconnected by each step halfway, a digital copy will not become effective, and (S15) If it is a halfway phase, since it is [that existence of copied material information will only be deleted from a magneto-optic-disk (1) side, and], as for existence of a record medium with two or more same contents, or (S17) is prevented anyway.

[0044] In addition, as shown in drawing 6 as a modification of the above-mentioned example, management information of the copy origin corresponding to the information which performs a digital copy is deleted first (or (S37)). (S35) then, even if it carries out an actual digital copy (S38) (or (S44)) and is made to update management information of a copy place (or (S47)) (S45), it is clear for the operation from which the same effectiveness as the above is acquired to carry out, in addition according to various deformation gestalten to be possible.

[0045] Moreover, although the example of the information record regenerative apparatus using the record medium which has the TOC field where management information is recorded explained in the above-mentioned example In the system using the record medium which does not have a TOC field The information on a copied material, That is, by carrying out elimination actuation (for example, the information on a silence condition being piled up and recorded) about the information of the 3rd (AM3) music of a magneto-optic disk (1) itself, if the above-mentioned example is made to suit, although it carries out necessary [of the time amount], it will be made as the same digital copy is possible.

[0046] in addition , although it explain using the rewritable example of the audio information which used CD format as the base in the above-mentioned example of a disk unit , it be limit to it , and it can carry out not to mention be applicable in other formats not only in the range which

do not deviate from the main point of this invention in the equipment equipment be a tape gestalt and **** treat image information and the data for computers but a disk gestalt .
[0047]

[Effect of the Invention] The information record regenerative apparatus applied to this invention as mentioned above A playback means to be an information record regenerative apparatus using the record medium with which the information which forbids a digital copy was included, and to reproduce the request information on the 1st record medium, It is the configuration characterized by having the deletion means which deletes information on the 1st record medium corresponding to a record means to record the output of a playback means on the request location on the 2nd record medium, and the information, to which it reproduces from the 1st record medium and record to the 2nd record medium is carried out.

[0048] Therefore, while being able to carry out without the digital copy of the request information from the 1st record medium to the 2nd record medium carrying out quality degradation, by performing deletion actuation of the copied material information on the 1st record medium, it is prevented that the same information exists in two or more record media, and it can also perform protection of copyrights.

[0049] moreover -- until the deletion actuation by the deletion means is completed -- the 1st record medium -- and -- or by considering as the configuration equipped with a means to forbid the discharge from the information record regenerative apparatus of the 2nd record medium, a user's unjust digital copy on purpose can be prevented beforehand, and it can consider as the system which gives a copyright holder (software supply side) sense of security.

[0050] Furthermore, the main information field where the main information, such as an audio and an image, is recorded as the 1st record medium of the above, and the 2nd record medium, By applying by the system using the record medium which consists of a management information field where the management information in which the record positional information for every main information is included with the information which forbids a digital copy is recorded While deletion actuation of copied material information can carry out in a short time, it is prevented that the same information exists at two or more record media in the case of powering off of an information record regenerative apparatus also including actuation of a user on purpose, and it can offer the information record regenerative apparatus which can ** performing safer protection of copyrights.

[0051] For a user, not to mention what carried out analog recording using the microphone etc. by itself, a digital copy without debasement can carry out any number of times, and can offer the new information record regenerative apparatus which can edit arbitration also about the music information which performed the digital copy along with SCMS.

[Translation done.]

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TECHNICAL FIELD

[Industrial Application] This invention relates to the information record regenerative apparatus using the record medium which the digitized audio signal etc. can record on arbitration, for example, a recordable compact disk.

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PRIOR ART

[Description of the Prior Art] Conventionally, the so-called compact disk (hereafter referred to as CD) with which continuation information, such as music information, was optically recorded by the detectable minute pit as a digital signal is used widely. As for CD, playback is performed by the optical disk regenerative apparatus only for playbacks (CD player).

[0003] Drawing 8 and drawing 9 are the schematic drawing for explaining the format used with CD. As shown in drawing 8, one frame (101a) of a record signal is constituted by the frame alignment signal (101b) which shows the head of a frame, the sub-code (101c) which shows the additional information of the main information, and the data field (101d) which added the parity code for error detection correction to the 24-byte data which are the main information. In addition, a data field (101d) consists of error detection correction methods which combined the interleave called CIRC (Cross Interleave Reed Solomon Code). moreover, as shown in drawing 9, as for a sub-code (101c), the above-mentioned frame accomplishes one subcoding frame (102c) (it is also hereafter called a sector) by 98 pieces, and the absolute-address information on a track number (the main information -- a sound -- called a tune number number when easy), and a disk etc. is shown. Since the die length of the above-mentioned sector is a second (1/75), it had been 1 second with the sector of 75, and the sector number has constituted the continuous hour entry and the positional information which carry out a sequential increment from the inner circumference side of a disk as address information (frames are 75 **) of a part:second:frame.

[0004] Drawing 7 is the mimetic diagram showing the field arrangement on the disk in CD.

[0005] The main information record section where the sector number (absolute address) according [a disk (100a)] to the main information and sub-codes, such as music information, is contained (100c), The additional information about each main information recorded on the above-mentioned main information record section (100c), for example, each track number, and the recording start sector number of each truck, the truck -- audio information, such as music, -- or it consists of TOC (Toble Of Contents) fields (100b) where the information which shows prohibition or authorization of the information and the digital copy which identify the data for computers is shown by the sub-code. By the above-mentioned format, by reading the sub-code information on the above-mentioned TOC field (100b) in a CD player at the time of loading of a disk The number of each main information (equivalent to the number of music in the case of music information), and the sector number of the recording start location, When an informational classification (an audio or data) is recognized and playback of a desired truck collates the sector number by the information on a TOC field (100b), and the sub-code of the main information record section (100c) to future playback directions, it performs promptly with access actuation.

[0006] Since these CDs are recorded by the constant linear velocity and the so-called CLV (Constant Linear Volocity) method at the time of record, its recording density is fixed in every location on a disk, and they have attained improvement in storage capacity. In an actual CD player, CLV control is performed by performing the roll control of a disk so that spacing of the regenerative signal of CD by which CLV record was carried out by the above-mentioned signal format, for example, a frame alignment signal, may serve as criteria length.

[0007] On the other hand, in case it is used recording various information, such as music information and computer information, on the disk of rewritable molds, such as a magneto-optic

disk with which development is furthered in recent years, it is desirable to offer the disk record regenerative apparatus which communalizes a playback system between the conventional CDs and has compatibility.

[0008] Since [, such as a frame alignment signal used for the absolute-address information and CLV control using the sub-code by the signal format of Above CD,] it does not exist at all, it becomes impossible in this case, to perform access actuation to the arbitration sector location before record, and CLV control required also during record in the initial disk which is not recording especially information. Then, the thing which is the absolute-address information and equivalence by said sub-code and which after a biphase mark modulation and each bit make disk radial the inside or an outside deflect the guide rail of an optical disk for the absolute address as a recording method of the address according to "1" and "0" absolutely, or changed the width of face of a guide rail is proposed. (Refer to JP,64-39632,A)

In that case, if the frequency band of the absolute address by the biphase mark modulation and the frequency band of the recording information by the EFM (Eightto Fourteen Modulation) modulation are made different, it is possible to separate both of each other and to reproduce, and access actuation is possible using the above-mentioned absolute address using the guide rail also to the field without recording information. Moreover, by using the playback carrier component of the above-mentioned absolute address also about CLV control, exact CLV control can be performed and it can carry out similarly during record.

[0009] By realizing CD in which such record is possible, the digital audio information from the usual CD player is connected through a D/A converter and an A/D converter, and the so-called digital copy without debasement becomes possible at a user level.

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EFFECT OF THE INVENTION

[Effect of the Invention] The information record regenerative apparatus applied to this invention as mentioned above A playback means to be an information record regenerative apparatus using the record medium with which the information which forbids a digital copy was included, and to reproduce the request information on the 1st record medium, It is the configuration characterized by having the deletion means which deletes information on the 1st record medium corresponding to a record means to record the output of a playback means on the request location on the 2nd record medium, and the information, to which it reproduces from the 1st record medium and record to the 2nd record medium is carried out.

[0048] Therefore, while being able to carry out without the digital copy of the request information from the 1st record medium to the 2nd record medium carrying out quality degradation, by performing deletion actuation of the copied material information on the 1st record medium, it is prevented that the same information exists in two or more record media, and it can also perform protection of copyrights.

[0049] moreover -- until the deletion actuation by the deletion means is completed -- the 1st record medium -- and -- or by considering as the configuration equipped with a means to forbid the discharge from the information record regenerative apparatus of the 2nd record medium, a user's unjust digital copy on purpose can be prevented beforehand, and it can consider as the system which gives a copyright holder (software supply side) sense of security.

[0050] Furthermore, the main information field where the main information, such as an audio and an image, is recorded as the 1st record medium of the above, and the 2nd record medium, By applying by the system using the record medium which consists of a management information field where the management information in which the record positional information for every main information is included with the information which forbids a digital copy is recorded While deletion actuation of copied material information can carry out in a short time, it is prevented that the same information exists at two or more record media in the case of powering off of an information record regenerative apparatus also including actuation of a user on purpose, and it can offer the information record regenerative apparatus which can ** performing safer protection of copyrights.

[0051] For a user, not to mention what carried out analog recording using the microphone etc. by itself, a digital copy without debasement can carry out any number of times, and can offer the new information record regenerative apparatus which can edit arbitration also about the music information which performed the digital copy along with SCMS.

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TECHNICAL PROBLEM

[Problem(s) to be Solved by the Invention] While it is technically easy about the above-mentioned digital copy, when this is made to permit without any restriction, since there is a problem socially, from the standpoint from which the copyright of a music title is protected, it is at the phase where opt for the regulation actually called SCMS (Serial Copy Management System), and operation is started. As for a digital copy, this SCMS permits only the 1st generation (namely, only in case of once), and the digital copy of the 2nd henceforth protects a music title implementer's copyright by making it forbid within audio equipment.

[0011] However, according to Above SCMS, a digital copy is made only once in treatment with the same said of that in which the user himself did analog recording using the microphone etc., but although he holds copyright, the irrational situation where edit using a digital copy without debasement cannot be performed generates it.

[0012] Moreover, even when only the music of hope was chosen from the record medium which carried out the digital copy from CD etc. and edit record was performed to another record medium, since a digital copy was not made, it had the demerit which will carry out by the analog copy and cannot receive the benefit of digital storage.

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MEANS

[Means for Solving the Problem] A playback means to be an information record regenerative apparatus using the record medium with which the information which forbids a digital copy was included in order that the information record regenerative apparatus concerning this invention might solve an above-mentioned technical-problem point, and to reproduce the request information on the 1st record medium, It is the configuration characterized by having the deletion means which deletes information on the 1st record medium corresponding to a record means to record the output of a playback means on the request location on the 2nd record medium, and the information, to which it reproduces from the 1st record medium and record to the 2nd record medium is carried out.

[0014] In addition, it is suitable to use the record medium which consists of a main information field where the main information, such as an audio and an image, is recorded as the 1st record medium of the above and the 2nd record medium, and a management information field where the management information in which the record positional information for every main information is included with the information which forbids a digital copy is recorded.

[0015] furthermore -- until the deletion actuation by the deletion means is completed -- the 1st record medium -- and -- or it is desirable to consider as the configuration equipped with a means to forbid the discharge from the information record regenerative apparatus of the 2nd record medium.

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OPERATION

[Function] In the information record regenerative apparatus concerning this invention, while the digital copy recorded on the request field of the 2nd record medium while the main information on the request reproduced from the 1st record medium has been digital information is performed, edit actuation of arbitration is attained by carrying out elimination of the main information to which the digital copy was performed, protecting copyright. Moreover, since elimination of the above-mentioned main information is carried out about management information by using the record medium which consists of a main information field where the main information, such as an audio and an image, is recorded, and a management-information field where the management information in which the record positional information for every main information is included with the information which forbids a digital copy is recorded as the 1st record medium of the above, and the 2nd record medium, edit actuation of arbitration is carried out for a short time, protecting copyright.

[0017] in addition -- before starting sound recording actuation in the above-mentioned actuation, until elimination actuation is completed -- the 1st record medium -- and -- or the discharge actuation from the information record regenerative apparatus of the 2nd record medium is forbidden, and it is prevented that the significant main information on the same contents exists in two or more record media.

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EXAMPLE

[Example] It will be as follows if one example at the time of applying this invention to the disk record regenerative apparatus using a rewritable mold disk is explained based on drawing 1 thru/or drawing 6. As shown in drawing 2, while the TOC field (1a) which is a management information field is established in the inner circumference side edge section, let the field of most outsides of a TOC field (1a) be the main information field (1b) at the magneto-optic disk (1) as an optical disk of a rewritable mold. While music information is recorded, a tune number number, an initiation absolute-address location, a termination absolute-address location, etc. for every additional information about each information recorded on the main information field (1b), for example, information, are recorded on a TOC field (1a) by the main information field (1b). Moreover, as shown in drawing 3, beforehand, a spiral guide rail (2-2 ...) (hatching shows for convenience) separates predetermined spacing to the disk radial, and is formed in the TOC field (1a) and the main information field (1b) in a magneto-optic disk (1). And the absolute address on a disk is deflected for the guide rail (2-2 ...) by the radial inside or the radial outside of a magneto-optic disk (1) corresponding to after a biphasic mark modulation, whether it is "1", or it is "0." In addition, the above-mentioned absolute address serves as prior recording information as roll control information on CLV, while expressing the location on a disk. Moreover, since the absolute address here corresponds with 1 sector in said CD format, it will also be hereafter called a sector.

[0019] Drawing 1 is the block diagram showing one example at the time of applying the information record regenerative apparatus concerning this invention to a disk record regenerative apparatus.

[0020] The disk record regenerative apparatus concerning this example is equipped with a unit (A) and a unit (B) as equipment which performs sound recording playback. While each unit can output and input audio information to the exterior It is constituted so that the audio information reproduced from a unit (A) corresponding to the case where the digital copy between record media is performed can be recorded in a unit (B) with digital information, and it is constituted so that each unit may be organically controlled by the controller (10). Since each unit is equipped with the common component, it attaches the name same about the same component for convenience in the following explanation, and distinguishes and explains it by the number. At magneto-optic-disk (1) spindle motor [which is rotated in support of / (22)] (4)/(24) with which it is loaded by loading device (35)/(36), and the time of playback, the laser beam was irradiated at / (22) and the disk record regenerative apparatus concerning this example is equipped with magneto-optic-disk (1) head [light / which reads recording information] (3)/(23). Optical head (3) While the signal reproduced by / (23) is amplified by playback amplifier (5)/(25) and the optical MAG signal made binary is supplied to playback data-processing circuit (9)/(29), said prior recording information is sent to recording information detector (6)/(26). Recording information detector (6) / (26) is constituted by a band-pass filter and PLL, and the clock which synchronized by PLL is generated to the prior recording information in the regenerative signal extracted with the band-pass filter. And the clock which synchronized with the above-mentioned prior recording information which consists of a biphasic mark modulation of absolute-address information is supplied to CLV control circuit (7)/(27). CLV control circuit (7) In / (27), the

above-mentioned synchronous clock from recording information detector (6)/(26) is compared with the reference frequency held inside, and exact CLV control is carried out by controlling spindle motor (4)/(24) by the difference signal. Moreover, the prior recording information in the regenerative signal extracted by recording information detector (6)/(26) is supplied to address detector (8)/(28). Address detector (8) / (28) consists of a biphase mark demodulator circuit and an address decoder, after it performs the biphase mark recovery of the prior recording information extracted by recording information detector (6)/(26), is decoded by the positional information on a disk, i.e., the absolute-address value which is a sector, by the address decoder, and is supplied to a controller (10). Playback data-processing circuit (9) In / (29), while performing separation and an EFM recovery of a frame alignment signal from the binary-ized light MAG signal in the regenerative signal supplied from playback amplifier (5)/(25), separating sub-code information and sending out to a controller (10), error correction actuation by CIRC using the parity of playback data is performed. Playback data-processing circuit (9) The playback data in which the error correction was carried out by / (29) are returned to an analog audio signal by the D/A (digital/analog) converter (15) through an electronic switch (14), and are outputted to the exterior as a terminal (16). Moreover, the playback audio data outputted from a playback data-processing circuit (9) side are supplied to an electronic switch (30).

[0021] On the other hand, after the analog audio information that it is inputted from a terminal (17) is changed into digital audio information by the A/D (analog to digital) converter (18), it is supplied to a record data-processing circuit (19) and an electronic switch (30).

[0022] Record data-processing circuit (19) In / (31), digital audio information from an A/D converter (18) In (record data-processing circuit (31 [however,]), parity ***** addition for error detection correction is performed in an A/D converter (18) or a playback data-processing circuit (it becomes the digital audio information from 9)) through an electronic switch (30). The sub-code information from a controller (10) is added, after eight-to-fourteen modulation, a frame alignment signal is added and coil driver (20)/(32) is supplied. Coil driver (20) / (32) drives coil (21)/(33) based on the supplied signal, and record of a signal is performed, when optical head (3)/(23) is irradiated by it and coincidence and the laser beam for record is irradiated by magneto-optic-disk (1)/(22). The signal format here is the same as that of the thing of CD used by said drawing 8 and drawing 9 , and explanation is omitted.

[0023] A controller (10) receives directions of the record rebirth of a user to unit (A)/(B) etc. through a control unit (12). Moreover, while recognizing the location to the disk field of optical head (3)/(23) in response to the absolute-address information (namely, sector value) from address detector (8)/(28), it has the accessing function which moves an optical head to a desired location using the optical head migration device which is not illustrated. Furthermore, while recognizing sub-code information given from playback data-processing circuit (9)/(29), when the recognized sub-codes are the contents of the TOC field, it is constituted so that it may be made to memorize as management information to TOC memory (11)/(34) and the readout of management information may be performed from TOC memory (11)/(34) if needed. And when the main information is newly recorded, management information in TOC memory (11)/(34) is updated. Record is performed through the above-mentioned record procedure by reading the contents of TOC memory (11)/(34) and supplying record data-processing circuit (19)/(31) as management information on the occasion of record of management information. Moreover, the location of optical head (3)/(23) using the above-mentioned absolute-address information besides the operating state for every unit, i.e., record, a playback location, etc. are constituted by the display (13) so that it may be displayed serially if needed. Furthermore, to loading device (35)/(36), it is constituted so that prohibition and authorization directions of discharge actuation of magneto-optic-disk (1)/(22) may be performed.

[0024] Drawing 4 applies the information record regenerative apparatus concerning this invention to the disk record regenerative apparatus of drawing 1 , is the flow chart of the processing control which made the subject the controller (10) in which one example in the case of performing the digital copy from a unit (A) to a unit (B) is shown, and explains it below as an example of a copy of the music information shown in drawing 5 .

[0025] Drawing 5 is the example of music information arrangement of magneto-optic disk (1) /

[before and after performing a digital copy] (22) top, and the hatching part in drawing means that significant music information does not exist.

[0026] (5a) is music information arrangement before the digital copy implementation in the magneto-optic disk (22) with which the loading device (36) of a unit (B) was loaded, and the 1st (BM1) music is arranged. Therefore, the contents of Table 1 are beforehand read from a magneto-optic disk (22) to the TOC memory (34) corresponding to a unit (B) as management information, and it memorizes.

[0027]

[Table 1]

曲番号	開始アドレス	終了アドレス
1	0 0 分 0 2 秒 0 0 フレーム	0 5 分 3 4 秒 7 4 フレーム

[0028] (5b) is music information arrangement before the digital copy implementation in the magneto-optic disk (1) with which the loading device (35) of a unit (A) was loaded, and the 1st (AM1) music thru/or the 4th (AM4) music are arranged, the contents of Table 2 are beforehand read from a magneto-optic disk (1) to the TOC memory (11) corresponding to a unit (A) as management information, and it is memorized.

[0029]

[Table 2]

曲番号	開始アドレス	終了アドレス
1	0 0 分 0 2 秒 0 0 フレーム	0 8 分 1 3 秒 7 4 フレーム
2	0 8 分 1 4 秒 0 0 フレーム	1 5 分 0 9 秒 7 4 フレーム
3	1 5 分 1 0 秒 0 0 フレーム	2 6 分 2 6 秒 7 4 フレーム
4	2 6 分 2 7 秒 0 0 フレーム	3 2 分 5 7 秒 7 4 フレーム

[0030] (5c) is music information arrangement after the digital copy implementation in the magneto-optic disk (1) of a unit (A) (namely, result of having performed a series of processings corresponding to a digital copy shown in drawing 4), and while the 3rd (AM3) music is deleted to (5b), it is shown that RINAN burring of that whose number was the 4th (AM4) is newly carried out as the 3rd (AM3') music.

[0031] And it is shown that are music information arrangement after the digital copy implementation in the magneto-optic disk (22) of a unit (B) (namely, result of having performed a series of processings corresponding to a digital copy shown in drawing 4), and the 2nd (BM2) (5d) music was newly added to (5a). Namely, the case where drawing 5 carries out the digital copy of the 3rd (AM3) music of a magneto-optic disk (1) as (BM2) from the head of the free area of a magneto-optic disk (22). Following (5a) (5b) the music information arrangement before and behind digital copy implementation is shown, the example of operation in the case of carrying out a digital copy to music information arrangement of an and (5d) from music information arrangement (5c) is explained using drawing 4 . In addition, since it is the case where a digital copy is performed, as data for sound recording of a unit (B), it is premised on the output of the playback data-processing circuit (9) which is the playback output of a unit (A) being connected as an input of a record data-processing circuit (31) through an electronic switch (30).

[0032] Controllers (10) are directions (it corresponds above) of a control unit (12) to a digital copy at (S1). If the case where the directions which copy the 3rd (AM3) music of a magneto-optic disk (1) to the free area of a magneto-optic disk (22) are given is given to an assumption The playback ending address (Ape is called hereafter) in a setup (S2) of the sound recording starting address (Ars is called hereafter) in a unit (B), a setup (S3) of the playback starting address (Aps is called hereafter) in a unit (A), and a unit (A) is set up (S4). If it is made to correspond to Table 1 and 2, (Ars) will serve as a free-area head of a magneto-optic disk (22). From Table 1 which is the contents of TOC memory (34), [00 frames (05 minutes and 35 seconds)] made into the next value of the ending address of the 1st music are given. Since the 3rd music of a magneto-optic disk (1) is reproduced, while [00 frames (15 minutes and 10 seconds)] which is the starting address of the 3rd music are given from Table 2 which is the contents of TOC memory (11), (Aps) [74 frames (26 minutes and 26 seconds)] which is the

ending address of the 3rd music as (Ape) are given.

[0033] Next, after performing access actuation to the location (Aps) of an optical head (3) by (S5), access actuation to the location (Ars) of an optical head (23) is performed by (S6), and prohibition directions of ejection actuation, i.e., discharge actuation of magneto-optic-disk (1)/(22), are performed to loading device (35)/(36) by (S7). And while the playback actuation from the location (Aps) of a magneto-optic disk (1), i.e., playback of the 3rd (AM3) music, is started by the above-mentioned flow of operation by (S8) By starting the sound recording from the location (Ars) to a magneto-optic disk (22) by the above-mentioned flow of operation by (S9) the digital copy actuation which the contents of the 3rd (AM3) music of the magneto-optic disk (1) are reproduced, and is recorded as the 2nd (BM2) music of a magneto-optic disk (22) is started And Whether playback of a magneto-optic disk (1) of the 3rd (AM3) music was completed by (S10) desired music playback and here While it is judged from the absolute-address information on the magneto-optic disk (1) obtained from an address detector (8), it amounts to (S11) when request playback is completed by having exceeded (Ape), and terminating the playback actuation by the side of a unit (A) The sound recording actuation by the side of a unit (B) is terminated by (S12), and the sound recording ending-address value (Are is called hereafter) in the magneto-optic disk at that time (22) is acquired from an address detector (28).

[0034] Next, renewal of the management information in TOC memory (11) is performed by (S13).

[0035] Here, it is updated by the contents which deletion of the 3rd (AM3) music as shown for corresponding to the digital copy by the playback of the 3rd (AM3) music shown to the contents of Table 2 (5b) (5c) etc. is performed, and are shown in Table 3.

[0036]

[Table 3]

曲番号	開始アドレス	終了アドレス
1	0 0 分 0 2 秒 0 0 フレーム	0 8 分 1 3 秒 7 4 フレーム
2	0 8 分 1 4 秒 0 0 フレーム	1 5 分 0 9 秒 7 4 フレーム
3	2 6 分 2 7 秒 0 0 フレーム	3 2 分 5 7 秒 7 4 フレーム

[0037] That is, as shown in Table 3, the management information about the 3rd (AM3) music reproduced corresponding to digital copy actuation is deleted, and they carry out RINAN burring, using as the 3rd (AM3') music the contents registered as the 4th (AM4) music. And (S14) after making an optical head (3) access the TOC field of a magneto-optic disk (1), renewal of management information of the TOC field on a magneto-optic disk (1) is performed by recording the contents of the TOC memory (11) shown in Table 3 by (S15).

[0038] Renewal [in / at continuing / TOC memory (34) (S16)] of management information is performed.

[0039] Here, it corresponds to the new sound recording of the 2nd (BM2) music as shown to the contents of Table 1 (5d), and is updated by the contents shown in Table 4.

[0040]

[Table 4]

曲番号	開始アドレス	終了アドレス
1	0 0 分 0 2 秒 0 0 フレーム	0 5 分 3 4 秒 7 4 フレーム
2	0 5 分 3 5 秒 0 0 フレーム	1 6 分 5 1 秒 7 4 フレーム

[0041] That is, as shown in Table 4, as a starting address of the 2nd music where the above (Ars) is new, (Are) is given as an ending address and added.

[0042] And by recording the contents of the TOC memory (34) shown in Table 4 by (S18), after making an optical head (23) access the TOC field of a magneto-optic disk (22) by (S17) After renewal of management information of the TOC field on a magneto-optic disk (22) was performed, Authorization directions of ejection actuation, i.e., discharge actuation of magneto-optic-disk (1)/(22), are performed to loading device (35)/(36) by (S19), future ejection actuation

is enabled, and a series of actuation is ended by (S20).

[0043] The digital copy by controlling two or more units organically as mentioned above is carried out. By deleting the copied material information which copied in this digital copy actuation, the audio information finally left behind serves as a gestalt which moves between record media, and it is prevented that the same contents exist in two or more record media so that clearly from the above-mentioned example. Since discharge of the magneto-optic disk with which will set by the time the midst by which the digital copy is carried out, and copied material information are deleted, and the record regenerative apparatus of a disk is loaded is forbidden, an unjust digital copy (a record medium with two or more same contents is obtained) is prevented from the ability of a user not to control information deletion of a copied material intentionally by disk discharge. Moreover, although how to disconnect the power source of a disk record regenerative apparatus compulsorily etc. can be considered as an another means to perform said unjust digital copy intentionally when a digital copy is completed It is constituted so that existence of main information may be recognized by only the management information of the TOC field on each magneto-optic disk in the above-mentioned example. After performing the digital copy of audio information (S13) (S15), management information deletion of a copied material is performed. After that (S16) Or (S18) since management information registration of a copy place is performed, If it is before (S14) even if a power source is disconnected by each step halfway, a digital copy will not become effective, and (S15) If it is a halfway phase, since it is [that existence of copied material information will only be deleted from a magneto-optic-disk (1) side, and], as for existence of a record medium with two or more same contents, or (S17) is prevented anyway.

[0044] In addition, as shown in drawing 6 as a modification of the above-mentioned example, management information of the copy origin corresponding to the information which performs a digital copy is deleted first (or (S37)). (S35) then, even if it carries out an actual digital copy (S38) (or (S44)) and is made to update management information of a copy place (or (S47)) (S45), it is clear for the operation from which the same effectiveness as the above is acquired to carry out, in addition according to various deformation gestalten to be possible.

[0045] Moreover, although the example of the information record regenerative apparatus using the record medium which has the TOC field where management information is recorded explained in the above-mentioned example In the system using the record medium which does not have a TOC field The information on a copied material, That is, by carrying out elimination actuation (for example, the information on a silence condition being piled up and recorded) about the information of the 3rd (AM3) music of a magneto-optic disk (1) itself, if the above-mentioned example is made to suit, although it carries out necessary [of the time amount], it will be made as the same digital copy is possible.

[0046] in addition , although it explain using the rewritable example of the audio information which used CD format as the base in the above-mentioned example of a disk unit , it be limit to it , and it can carry out not to mention be applicable in other formats not only in the range which do not deviate from the main point of this invention in the equipment equipment be a tape gestalt and **** treat image information and the data for computers but a disk gestalt .

[Translation done.]

* NOTICES *

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1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.*** shows the word which can not be translated.

3.In the drawings, any words are not translated.

DESCRIPTION OF DRAWINGS

[Brief Description of the Drawings]

[Drawing 1] It is the block diagram of an information record regenerative apparatus.

[Drawing 2] It is the outline top view of a magneto-optic disk.

[Drawing 3] It is the expansion top view of a magneto-optic disk.

[Drawing 4] It is the flow chart which shows the control flow of digital copy actuation of an information record regenerative apparatus.

[Drawing 5] It is the mimetic diagram showing the music information arrangement on a disk before and after performing a digital copy.

[Drawing 6] They are other examples of the flow chart which shows the control flow of digital copy actuation of an information record regenerative apparatus.

[Drawing 7] It is the outline top view of a compact disk.

[Drawing 8] It is the mimetic diagram showing the frame signal format of a compact disk.

[Drawing 9] It is the mimetic diagram showing the sector format of a compact disk.

[Description of Notations]

A, B Unit

10 Controller

1 22 Magneto-optic disk

3 23 Optical head

9 29 Playback data-processing circuit

6 26 Recording information detector

19 31 Record data-processing circuit

[Translation done.]

* NOTICES *

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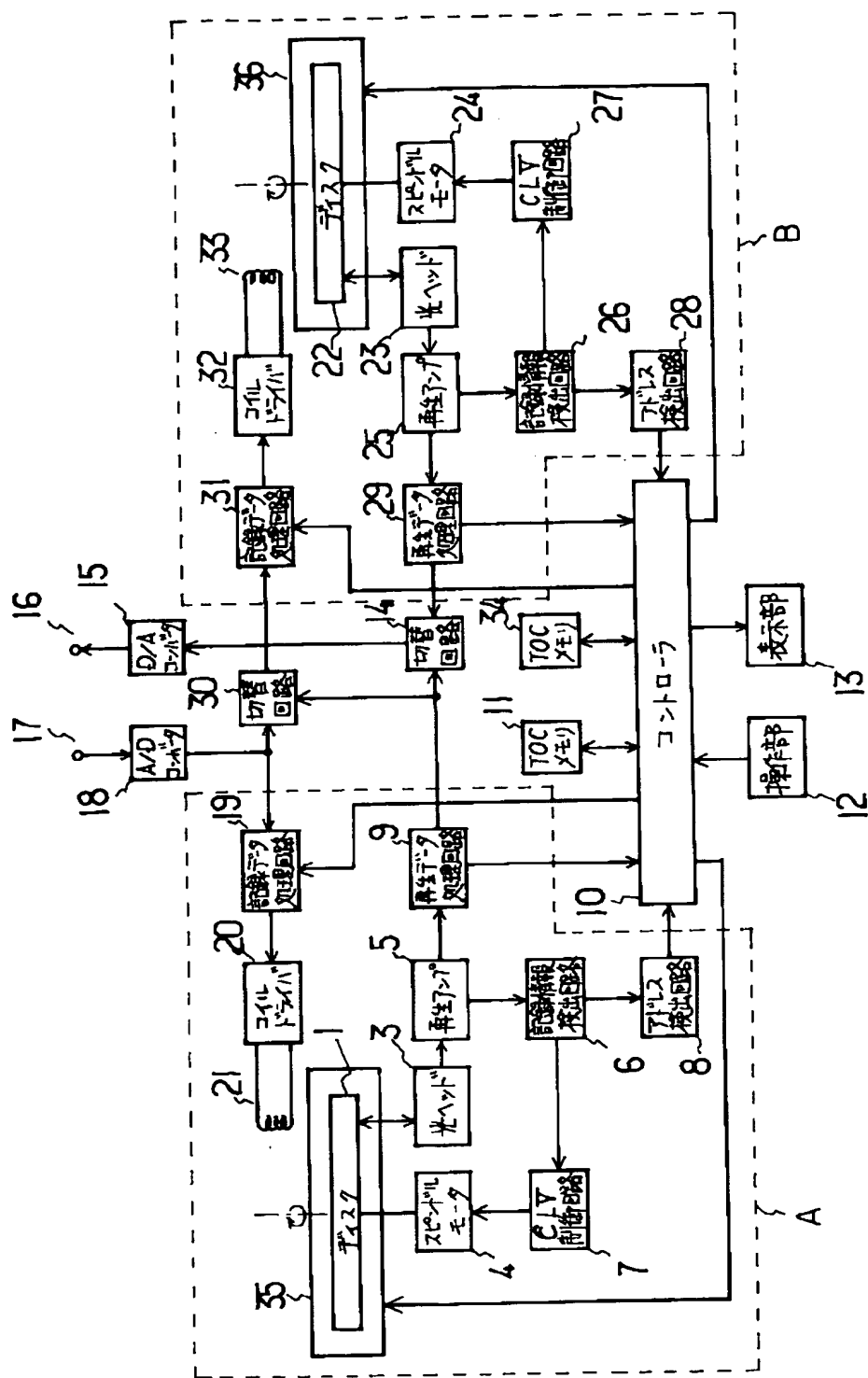
1.This document has been translated by computer. So the translation may not reflect the original precisely.

2.**** shows the word which can not be translated.

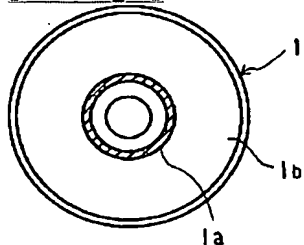
3.In the drawings, any words are not translated.

DRAWINGS

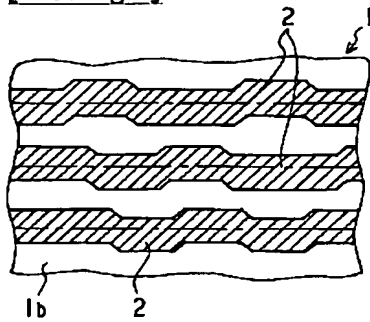
[Drawing 1]



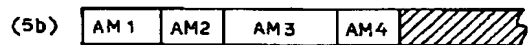
[Drawing 2]



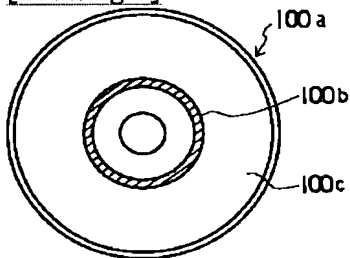
[Drawing 3]



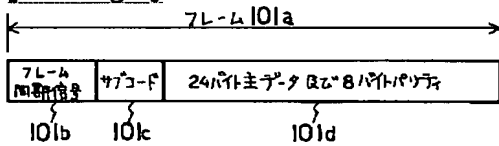
[Drawing 5]



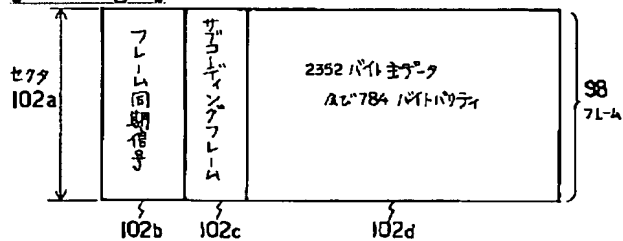
[Drawing 7]



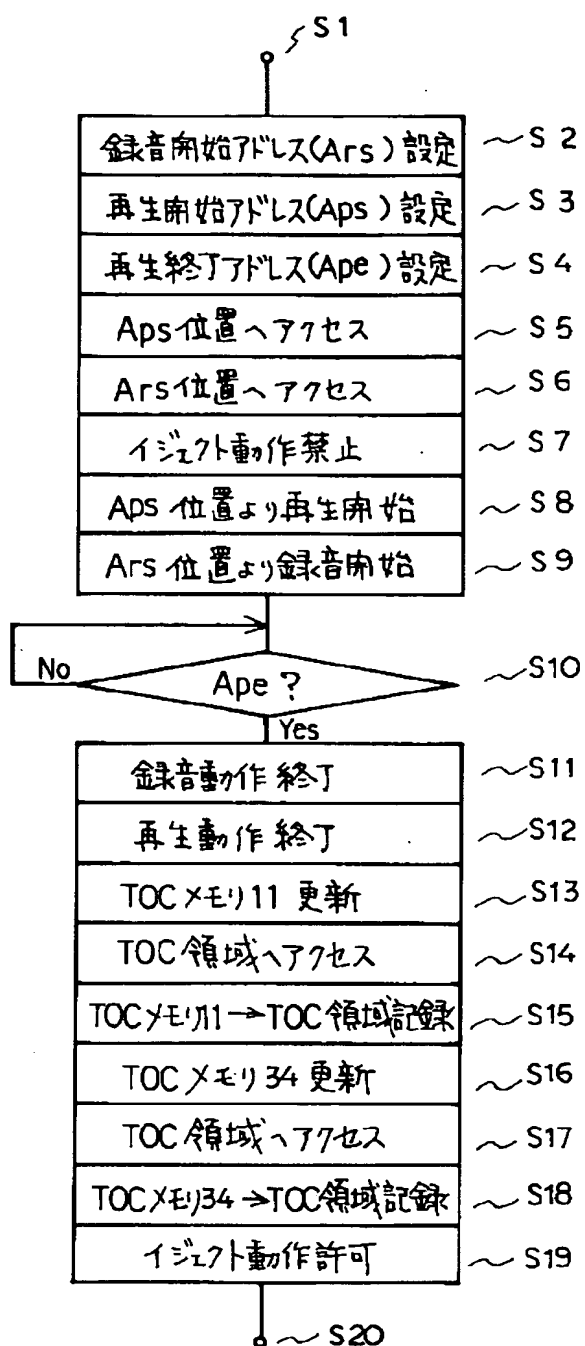
[Drawing 8]



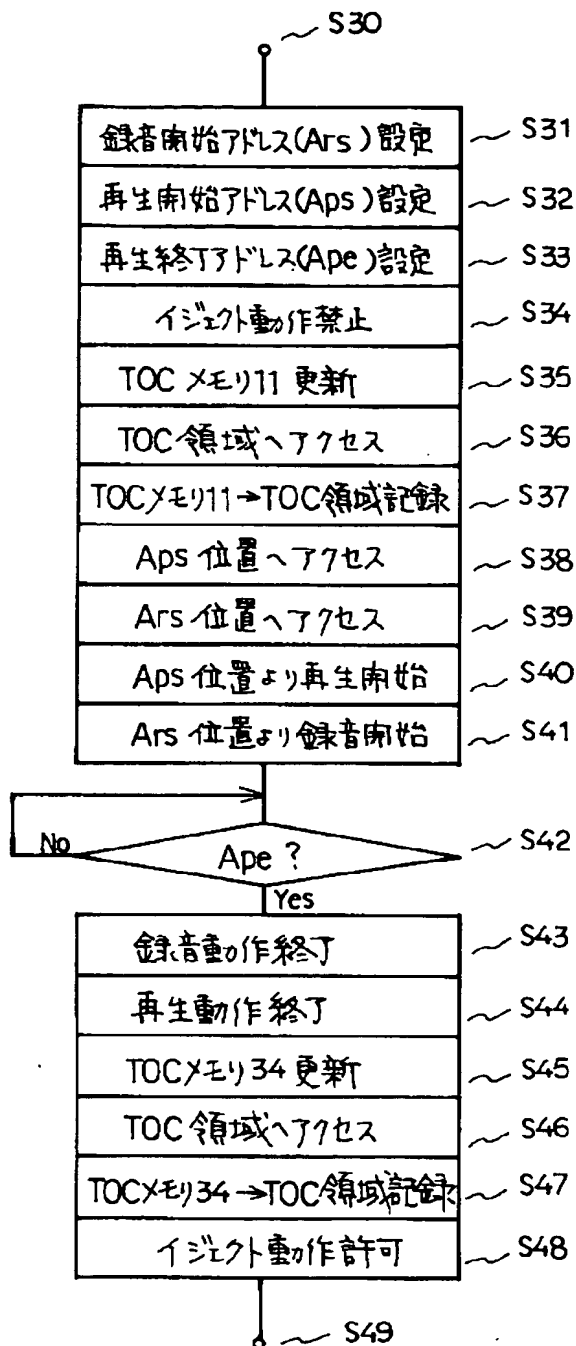
[Drawing 9]



[Drawing 4]



[Drawing 6]



[Translation done.]

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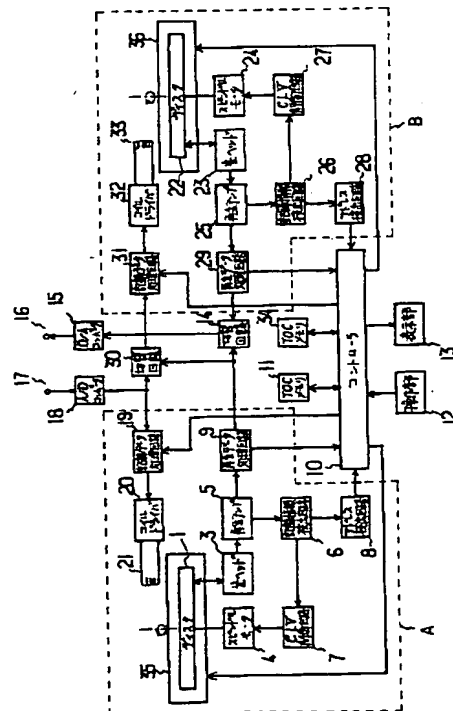
(74) 代理人 弁理士 梅田 勝

(54) 【発明の名称】 情報記録再生装置

(57) 【要約】

【目的】 著作権を保護しながら、デジタルコピーの禁止された情報源の任意編集を可能とする。

【構成】 デジタルコピーを禁止する情報が含まれた記録媒体を用いる情報記録再生装置であって、第1記録媒体上の所望情報を再生する再生手段と、再生手段の出力を第2記録媒体上の所望位置に記録する記録手段と、第1記録媒体から再生して第2記録媒体への記録が行われる情報に対応する第1記録媒体上の情報の抹消を行う抹消手段とを有することを特徴としている。更に、抹消手段による抹消動作が完了するまでの間、第1記録媒体及び又は第2記録媒体の情報記録再生装置からの排出を禁止する手段を備えたことを特徴としている。



【特許請求の範囲】

【請求項 1】 デジタルコピーを禁止する情報が含まれた記録媒体を用いる情報記録再生装置であって、第 1 記録媒体上の所望情報を再生する再生手段と、再生手段の出力を第 2 記録媒体上の所望位置に記録する記録手段と、第 1 記録媒体から再生して第 2 記録媒体への記録が行われる情報に対応する第 1 記録媒体上の情報の抹消を行う抹消手段とを有することを特徴とする情報記録再生装置。

【請求項 2】 第 1 記録媒体及び第 2 記録媒体はオーディオや画像等の主情報が記録される主情報領域と、各々の主情報毎の記録位置情報がデジタルコピーを禁止する情報と共に含まれる管理情報が記録される管理情報領域よりなる記録媒体であることを特徴とする請求項 1 に記載の情報記録再生装置。

【請求項 3】 抹消手段による抹消動作が完了するまでの間、第 1 記録媒体及び又は第 2 記録媒体の情報記録再生装置からの排出を禁止する手段を備えたことを特徴とする請求項 1 に記載の情報記録再生装置。

【発明の詳細な説明】

【0001】

【産業上の利用分野】 本発明は、デジタル化したオーディオ信号等が任意に記録できる記録媒体、例えば記録可能なコンパクトディスクを用いた情報記録再生装置に関する。

【0002】

【従来の技術】 従来、音楽情報等の連続情報が光学的に検出可能な微小ピットによりデジタル信号として記録されたいわゆるコンパクトディスク（以下、CD と呼ぶ）が広く使用されている。CD は再生専用の光ディスク再生装置（CD プレーヤ）により再生が行われるようになっている。

【0003】 図 8 及び図 9 は CD で用いられるフォーマットを説明するための略図である。図 8 に示すように記録信号の 1 フレーム（101a）は、フレームの先頭を示すフレーム同期信号（101b）と、主情報の付加情報（101c）と、主情報である 24 バイトデータにエラー検出訂正用パリティ符号を付加したデータフィールド（101d）により構成される。

尚、データフィールド（101d）は CIRC（Cross Interleave Reed Solomon Code）と呼ばれるインタリーブを組み合わせたエラー検出訂正方式で構成される。又、サブコード（101c）は図 9 に示すように上記フレームが 98 個で 1 つのサブコーディングフレーム（102c）（以下、セクタとも呼ぶ）を成し、トラック番号（主情報が音楽の場合は曲番号と呼ばれる）及びディスク上の絶対アドレス情報等が示される。上記セクタの長さは（1/75）秒であるので、75 のセクタで 1 秒となり、セクタ番号は分：秒：フレームのアドレス情報（フレームは 75

進）として、ディスクの内周側より順次増加する連続した時間情報及び位置情報を成している。

【0004】 図 7 は CD におけるディスク上の領域配置を示す模式図である。

【0005】 ディスク（100a）は音楽情報等の主情報及びサブコードによるセクタ番号（絶対アドレス）が含まれる主情報記録領域（100c）と、上記主情報記録領域（100c）に記録された各々の主情報に関する付加情報、例えば各トラック番号及び各トラックの記録開始セクタ番号と、そのトラックが音楽等のオーディオ情報か又はコンピュータ用データかを識別する情報及びデジタルコピーの禁止又は許可を示す情報等がサブコードで示される TOC（Table Of Contents）領域（100b）より構成されている。上記フォーマットにより、CD プレーヤにおいてはディスクの装填時に上記 TOC 領域（100b）のサブコード情報を読み出すことにより、各々の主情報の数（音楽情報の場合、曲数に相当）及びその記録開始位置のセクタ番号と、情報の種別（オーディオ又はデータ）を認知し、以後の再生指示に対して所望のトラックの再生が、TOC 領域（100b）の情報と、主情報記録領域（100c）のサブコードによるセクタ番号の照合を行うことにより、アクセス動作を伴って速やかに実行される。

【0006】 これら CD は記録時に線速度一定、いわゆる CLV（Constant Linear Velocity）方式で記録されている為、記録密度がディスク上のどの位置でも一定であり、記録容量の向上を達成している。実際の CD プレーヤにおいては、上記信号フォーマットで CLV 記録された CD の再生信号、例えばフレーム同期信号の間隔が基準長となるよう、ディスクの回転制御を行うことにより、CLV 制御が実行される。

【0007】 一方、近年開発が進められている光磁気ディスク等の書き換え可能型のディスクに音楽情報やコンピュータ情報等の各種情報を記録して使用する際に、従来の CD との間で再生方式を共通化し、互換性を有するディスク記録再生装置を提供することが望ましい。

【0008】 この場合、特に情報の記録を行っていない初期ディスクにおいては、上記 CD の信号フォーマットによるサブコードを用いた絶対アドレス情報及び CLV 制御に用いていたフレーム同期信号等、一切存在しないため、記録に先立った任意セクタ位置へのアクセス動作、及び、記録中にも必要な CLV 制御が行えなくなる。そこで、前記サブコードによる絶対アドレス情報と等価な絶対アドレスの記録方式として、絶対アドレスをバイフェーズマーク変調後、各ビットが“1”か“0”かに応じて光ディスクの案内溝をディスク半径方向の内側又は外側に偏倚させるか又は案内溝の幅を変更するようにしたもの提案されている。（特開昭 64-39632 号公報参照）

その場合、バイフェーズマーク変調による絶対アドレスの周波数帯域と、EFM (Eight to Fourteen Modulation) 変調による記録情報の周波数帯域とを相違させておけば、両者を互いに分離して再生することが可能であり、記録情報がない領域に対しても案内溝を用いた上記絶対アドレスを用いてアクセス動作が可能である。又、CLV制御についても上記絶対アドレスの再生キャリア成分を用いることにより、正確なCLV制御ができ、記録中においても同様に実施可能である。

【0009】このような記録が可能なCDが実現されることにより、例えば通常のCDプレーヤからのデジタルオーディオ情報をD/Aコンバータ及びA/Dコンバータを介する事なく接続し、品質低下のないいわゆるデジタルコピーがユーザーレベルで可能となる。

【0010】

【発明が解決しようとする課題】上記デジタルコピーについては技術的には容易である反面、これを無制限に許容させると音楽ソフトの著作権を保護する見地からは社会的に問題が有るため、現実的にはSCMS (Serial Copy Management System) と呼ばれる規制が決められ、運用が開始されている段階である。このSCMSはデジタルコピーは第1世代のみ（即ち1回のみ）を許可し、2回目以降のデジタルコピーはオーディオ機器内で禁止させることで音楽ソフト作成者の著作権を保護するものである。

【0011】しかしながら上記SCMSによれば、ユーザー自らがマイク等を用いてアナログ録音したものも同様の扱いでデジタルコピーは1回しかできず、著作権は自分自身が保有しているにも拘わらず、品質低下のないデジタルコピーを用いた編集を行えないという不合理な事態が発生する。

【0012】又、CD等からのデジタルコピーを実施した記録媒体から希望の曲のみを選んで別の記録媒体に編集記録を行う場合でもデジタルコピーはできないため、アナログコピーにて実施することになってデジタル記録の恩恵が受けられないデメリットがあった。

【0013】

【課題を解決するための手段】本発明に係る情報記録再生装置は上述の課題点を解決するために、デジタルコピーを禁止する情報が含まれた記録媒体を用いる情報記録再生装置であって、第1記録媒体上の所望情報を再生する再生手段と、再生手段の出力を第2記録媒体上の所望位置に記録する記録手段と、第1記録媒体から再生して第2記録媒体への記録が行なわれる情報に対応する第1記録媒体上の情報の抹消を行う抹消手段とを有することを特徴とする構成である。

【0014】尚、上記第1記録媒体及び第2記録媒体としてはオーディオや画像等の主情報が記録される主情報領域と、各々の主情報毎の記録位置情報がデジタルコピ

ーを禁止する情報と共に含まれる管理情報が記録される管理情報領域よりなる記録媒体を用いることが好適である。

【0015】更に、抹消手段による抹消動作が完了するまでの間、第1記録媒体及び又は第2記録媒体の情報記録再生装置からの排出を禁止する手段を備えた構成とすることが望ましい。

【0016】

【作用】本発明に係る情報記録再生装置では、第1記録媒体から再生された所望の主情報がデジタル情報のまま第2記録媒体の所望領域に記録されるデジタルコピーが行われると共に、デジタルコピーが行われた主情報の消去が実施されることにより、著作権の保護を行いつつ任意の編集動作が可能になる。又、上記第1記録媒体及び第2記録媒体として、オーディオや画像等の主情報が記録される主情報領域と各々の主情報毎の記録位置情報がデジタルコピーを禁止する情報と共に含まれる管理情報が記録される管理情報領域よりなる記録媒体を用いることにより、上記主情報の消去が管理情報について実施されるため、著作権の保護を行いつつ任意の編集動作が短時間で実施される。

【0017】尚、上記動作においては録音動作が開始される以前より消去動作が完了するまでの間、第1記録媒体及び又は第2記録媒体の情報記録再生装置からの排出動作が禁止され、同一内容の有意な主情報が複数の記録媒体に存在することが防止される。

【0018】

【実施例】本発明を書き換え可能型ディスクを用いたディスク記録再生装置に適用した場合の一実施例について、図1乃至図6に基づいて説明すれば、以下の通りである。図2に示すように、書き換え可能型の光ディスクとしての光磁気ディスク(1)には、その内周側端部に管理情報領域であるTOC領域(1a)が設けられると共に、TOC領域(1a)の外側の大部分の領域が主情報領域(1b)とされている。主情報領域(1b)には、音楽情報が記録される一方、TOC領域(1a)には、主情報領域(1b)に記録された各情報に関する付加情報、例えば各情報毎の曲番号と開始絶対アドレス位置及び終了絶対アドレス位置等が記録されるようになっている。又、図3に示すように、光磁気ディスク(1)におけるTOC領域(1a)及び主情報領域(1b)には予め螺旋状の案内溝(2・2・・・・)（便宜上ハッチングで示す）がディスク半径方向に所定の間隔を隔てて形成されている。そして、ディスク上の絶対アドレスはバイフェーズマーク変調後、“1”であるか、あるいは“0”であるかに対応して、案内溝(2・2・・・・)が光磁気ディスク(1)の半径方向の内側又は外側に偏倚させられている。尚、上記の絶対アドレスがディスク上の位置を表すと共に、CLVの回転制御情報としての事前記録情報となる。又、ここでの絶対アドレスは前記C

Dフォーマットにおける1セクタと対応しているため、以下、セクタとも呼ぶことにする。

【0019】図1は本発明に係る情報記録再生装置を、ディスク記録再生装置に適用した場合の一実施例を示すブロック図である。

【0020】本実施例に係るディスク記録再生装置は録音再生を行う装置としてユニット(A)及びユニット

(B)を備え、各々のユニットが外部に対してオーディオ情報の入出力が行える一方、記録媒体間のデジタルコピーを行う場合に対応してユニット(A)より再生されるオーディオ情報をデジタル情報のままユニット(B)で録音できるよう構成され、各々のユニットがコントローラ(10)によって有機的に制御されるよう構成される。各々のユニットは共通の構成要素を備えているため、以下の説明においては便宜上、同一の構成要素については同一の名称を付し番号で区別して説明する。本実施例に係るディスク記録再生装置はローディング機構

(35)/(36)によって装填される光磁気ディスク(1)/(22)を支持して回転させるスピンドルモータ(4)/(24)と、再生時に光磁気ディスク(1)/(22)にレーザ光を照射し、記録情報の読み取りを行う光ヘッド(3)/(23)を備えている。光ヘッド(3)/(23)で再生された信号は再生アンプ(5)/(25)で増幅され、2値化された光磁気信号が再生データ処理回路(9)/(29)に供給される一方、前記事前記録情報が記録情報検出回路(6)/(26)に送られる。記録情報検出回路(6)/(26)は例えば帯域通過フィルタとPLLにより構成され、帯域通過フィルタにより抽出された再生信号中の事前記録情報に対し、PLLによって同期したクロックが生成されるようになっている。そして絶対アドレス情報のバイフェーズマーク変調からなる上記事前記録情報に同期したクロックがCLV制御回路(7)/(27)に供給される。CLV制御回路(7)/(27)では記録情報検出回路(6)/(26)からの上記同期クロックと、内部で保有している基準周波数とを比較し、その差信号でスピンドルモータ(4)/(24)を制御することにより、正確なCLV制御が実施される。又、記録情報検出回路(6)/(26)で抽出された再生信号中の事前記録情報はアドレス検出回路(8)/(28)へ供給される。アドレス検出回路(8)/(28)はバイフェーズマーク復調回路及びアドレスデコードよりなり、記録情報検出回路(6)/(26)で抽出された事前記録情報のバイフェーズマーク復調を行った後、アドレスデコードによりディスク上の位置情報、即ちセクタである絶対アドレス値にデコードされて、コントローラ(10)へ供給される。再生データ処理回路(9)/(29)では再生アンプ(5)/(25)から供給される再生信号中の2値化光磁気信号からフレーム同期信号の分離及びEFM復調を行いサブコード情報を分離してコントローラ(1

0)へ送出すると共に、再生データのバリティを用いたCIRCによるエラー訂正動作を行う。再生データ処理回路(9)/(29)によりエラー訂正された再生データは、切替回路(14)を介してD/A(デジタル/アナログ)コンバータ(15)でアナログオーディオ信号に戻されて外部へ端子(16)として出力される。又、再生データ処理回路(9)側より出力される再生オーディオデータは切替回路(30)へも供給される。

【0021】一方、端子(17)より入力されるアナログオーディオ情報は、A/D(アナログ/デジタル)コンバータ(18)によってデジタルオーディオ情報に変換された後、記録データ処理回路(19)及び切替回路(30)に供給される。

【0022】記録データ処理回路(19)/(31)ではA/Dコンバータ(18)からのデジタルオーディオ情報(但し、記録データ処理回路(31)では切替回路(30)を介してA/Dコンバータ(18)又は再生データ処理回路(9)からのデジタルオーディオ情報となる)にエラー検出訂正用パリティ生成付加を行い、コントローラ(10)からのサブコード情報が付加されて、EFM変調後、フレーム同期信号が付加されてコイルドライバ(20)/(32)に供給されるようになっている。コイルドライバ(20)/(32)は供給された信号に基づいて、コイル(21)/(33)を駆動し、それと同時に光ヘッド(3)/(23)が光磁気ディスク(1)/(22)に記録用レーザ光が照射されることにより、信号の記録が行われるものである。ここでの信号フォーマットは、前記図8及び図9で用いたCDのものと同一であり、説明は省略する。

【0023】コントローラ(10)は、操作部(12)を介してユニット(A)/(B)に対するユーザーの記録再生等の指示を受けるようになっている。又、アドレス検出回路(8)/(28)からの絶対アドレス情報(即ちセクタ値)を受けて光ヘッド(3)/(23)のディスク領域に対する位置を認識すると共に、図示しない光ヘッド移動機構を用いて光ヘッドを所望の位置へ移動させるアクセス機能を有する。更に、再生データ処理回路(9)/(29)から与えられるサブコード情報の認識を行うと共に、認識したサブコードがTOC領域の内容である場合にはTOCメモリ(11)/(34)へ管理情報として記憶させ必要に応じてTOCメモリ(11)/(34)から管理情報の読みだしを行うよう構成される。そして新たに主情報の記録を行った際には、TOCメモリ(11)/(34)における管理情報の更新を行う。管理情報の記録に際しては、TOCメモリ(11)/(34)の内容を読み出して管理情報として記録データ処理回路(19)/(31)に供給することにより、上記記録手順を経て記録が行われる。又、表示部(13)にはユニット毎の動作状態の他、上記絶対アドレス情報による光ヘッド(3)/(23)の位置、即ち

記録又は再生位置等が、必要に応じて逐次表示されるように構成される。更に、ローディング機構(35)/(36)に対し、光磁気ディスク(1)/(22)の排出手作の禁止及び許可指示を行うよう構成される。

【0024】図4は、本発明に係る情報記録再生装置を図1のディスク記録再生装置に適用し、ユニット(A)からユニット(B)へのデジタルコピーを行う場合の一実施例を示すコントローラ(10)を主体とした処理制御のフローチャートであり、図5に示す音楽情報のコピー例として以下に説明する。

【0025】図5はデジタルコピーを行う前後の光磁気ディスク(1)/(22)上の音楽情報配置の例であ *

曲番号	開始アドレス	終了アドレス
1	00分02秒00フレーム	05分34秒74フレーム

【0028】(5b)はユニット(A)のローディング機構(35)に装填された光磁気ディスク(1)におけるデジタルコピー実施前の音楽情報配置であり、1曲目(AM1)乃至4曲目(AM4)が配置されており、ユニット(A)に対応するTOCメモリ(11)には管理※20

曲番号	開始アドレス	終了アドレス
1	00分02秒00フレーム	08分13秒74フレーム
2	08分14秒00フレーム	15分09秒74フレーム
3	15分10秒00フレーム	26分26秒74フレーム
4	26分27秒00フレーム	32分57秒74フレーム

【0030】(5c)はユニット(A)の光磁気ディスク(1)におけるデジタルコピー実施後(即ち、図4に示す一連のデジタルコピー対応処理を行った結果)の音楽情報配置であり、(5b)に対して3曲目(AM3)が抹消されると共に、4曲目(AM4)であったものが3曲目(AM3')として新たにリナンバリングされていることを示している。

【0031】そして、(5d)はユニット(B)の光磁気ディスク(22)におけるデジタルコピー実施後(即ち、図4に示す一連のデジタルコピー対応処理を行った結果)の音楽情報配置であり、(5a)に対して2曲目(BM2)が新たに追加されたことを示している。即ち図5は、光磁気ディスク(1)の3曲目(AM3)を、光磁気ディスク(22)の空き領域の先頭より(BM2)としてデジタルコピーする場合の、デジタルコピー実施前後の音楽情報配置について示しており、以下に(5a)及び(5b)の音楽情報配置から(5c)及び(5d)の音楽情報配置にデジタルコピーを行う場合の動作例を、図4を用いて説明する。尚、ユニット(B)の録音対象データとしては、デジタルコピーを行う場合であるため、ユニット(A)の再生出力である再生データ処理回路(9)の出力が切替回路(30)を介して記録データ処理回路(31)の入力として接続されていることを前提としている。

*り、図中のハッチング部分は有意な音楽情報が存在しないことを表している。

【0026】(5a)はユニット(B)のローディング機構(36)に装填された光磁気ディスク(22)におけるデジタルコピー実施前の音楽情報配置であり、1曲目(BM1)のみが配置されている。従って、ユニット(B)に対応するTOCメモリ(34)には管理情報として、表1の内容が予め光磁気ディスク(22)から読み出されて記憶されている。

【0027】

【表1】

※情報として、表2の内容が予め光磁気ディスク(1)から読み出されて記憶されている。

【0029】

【表2】

【0032】コントローラ(10)は、(S1)にて操作部(12)からデジタルコピーの指示(上記に対応し、光磁気ディスク(1)の3曲目(AM3)を光磁気ディスク(22)の空き領域にコピーする指示が与えられた場合を想定)が与えられると、ユニット(B)における録音開始アドレス(以下、Ar sと称する)の設定(S2)、ユニット(A)における再生開始アドレス(以下、Ap sと称する)の設定(S3)、ユニット(A)における再生終了アドレス(以下、Ap eと称する)の設定(S4)を行う。表1及び表2に対応させると、(Ar s)は光磁気ディスク(22)の空き領域先頭となり、TOCメモリ(34)の内容である表1より、1曲目の終了アドレスの次の値とされた[05分35秒00フレーム]が与えられ、(Ap s)は光磁気ディスク(1)の3曲目を再生するのであるから、TOCメモリ(11)の内容である表2より、3曲目の開始アドレスである[15分10秒00フレーム]が与えられると共に、(Ap e)として3曲目の終了アドレスである[26分26秒74フレーム]が与えられる。

【0033】次に、(S5)にて光ヘッド(3)の(Ap s)位置へのアクセス動作を行った後、(S6)にて光ヘッド(23)の(Ar s)位置へのアクセス動作が行われ、(S7)にてイジェクト動作、即ち光磁気ディスク(1)/(22)の排出手作の禁止指示がローディ

ング機構(35)/(36)に対して行われる。そして、(S8)にて光磁気ディスク(1)の(Aps)位置からの再生動作、即ち3曲目(AM3)の再生が前述の動作流れにて開始されると共に、(S9)にて光磁気ディスク(22)への(Ars)位置からの録音が前述の動作流れにて開始されることにより、光磁気ディスク(1)の3曲目(AM3)の内容が再生され光磁気ディスク(22)の2曲目(BM2)として録音されるデジタルコピー動作が開始される。そして、(S10)にて所望の音楽再生、ここでは光磁気ディスク(1)の3曲目(AM3)の再生が終了したかどうか、アドレス検出回路(8)より得られる光磁気ディスク(1)の絶対アドレス情報より判定され、(Ape)を越えたことにより所望再生が終了した時点で(S11)に達し、ユニ*

* ユニット(A)側の再生動作を終了させると共に、(S12)にてユニット(B)側の録音動作を終了させ、そのときの光磁気ディスク(22)における録音終了アドレス値(以下、Areと称する)をアドレス検出回路(28)より得る。

【0034】次に、(S13)にてTOCメモリ(11)における管理情報の更新が行われる。

【0035】ここでは表2の内容に対し(5b)に示す3曲目(AM3)の再生によるデジタルコピーに対応し(5c)に示すような3曲目(AM3)の抹消等が行われて表3に示す内容に更新される。

【0036】

【表3】

曲番号	開始アドレス	終了アドレス
1	00分02秒00フレーム	08分13秒74フレーム
2	08分14秒00フレーム	15分09秒74フレーム
3	26分27秒00フレーム	32分57秒74フレーム

【0037】即ち、表3に示すように、デジタルコピー動作に対応して再生を行った3曲目(AM3)に関する管理情報を抹消し、4曲目(AM4)として登録されていた内容を3曲目(AM3')としてリナンバリングするものである。そして(S14)にて光磁気ディスク(1)のTOC領域に光ヘッド(3)をアクセスさせた後、(S15)にて表3に示すTOCメモリ(11)の内容が記録されることにより、光磁気ディスク(1)上※

※のTOC領域の管理情報更新が行われる。

【0038】続いて(S16)ではTOCメモリ(34)における管理情報更新が行われる。

【0039】ここでは、表1の内容に対し(5d)に示すような2曲目(BM2)の新たな録音に対応し、表4に示す内容に更新される。

【0040】

【表4】

曲番号	開始アドレス	終了アドレス
1	00分02秒00フレーム	05分34秒74フレーム
2	05分35秒00フレーム	16分51秒74フレーム

【0041】即ち、表4に示すように、上記(Ars)が新たな2曲目の開始アドレスとして、(Are)が終了アドレスとして与えられ、付加されるものである。

【0042】そして、(S17)にて光磁気ディスク(22)のTOC領域に光ヘッド(23)をアクセスさせた後、(S18)にて表4に示すTOCメモリ(34)の内容が記録されることにより、光磁気ディスク(22)上のTOC領域の管理情報更新が行われた後、(S19)にてイジェクト動作、即ち光磁気ディスク(1)/(22)の排出動作の許可指示がローディング機構(35)/(36)に対して行われ、以後のイジェクト動作を可能とさせ、(S20)にて一連の動作を終了する。

【0043】以上のようにして複数のユニットを有機的に制御することによるデジタルコピーが実施される。上記例から明らかなように、このデジタルコピー動作においてはコピーを行ったコピー元情報が抹消されることに

より最終的に残されるオーディオ情報は記録媒体間を移動する形態となり、同一の内容が複数の記録媒体に存在することが防止される。デジタルコピーが実施されている最中、及びコピー元情報が抹消されるまでの間においてはディスクの記録再生装置に装填されている光磁気ディスクの排出が禁止されているため、ユーザーはコピー元の情報抹消をディスク排出により故意に制止することはできないことから不正なデジタルコピー(複数の同一内容を有した記録媒体を得る)は防止される。又、前記不正なデジタルコピーを故意に行う別的手段として、デジタルコピーが終了した時点でディスク記録再生装置の電源を強制的に切断する方法等が考えられるが、上記実施例においては各々の光磁気ディスク上のTOC領域の管理情報によってのみ主情報の存在が認識されるよう構成され、オーディオ情報のデジタルコピーを行った後に(S13)乃至(S15)にてコピー元の管理情報抹消が行われ、その後(S16)乃至(S18)にてコピ

一先の管理情報登録が行われるため、それぞれのステップ途中で電源が切断されたとしても（S14）以前であればデジタルコピーが有効とはならないし、（S15）乃至（S17）の中途段階であれば光磁気ディスク

（1）側からはコピー元情報の存在が抹消されてしまうのみであるから、いずれにしても複数の同一内容を有した記録媒体の存在は防止されるものである。

【0044】尚、上記実施例の変形例として図6に示すように、デジタルコピーを行う情報に対応するコピー元の管理情報をまず抹消（S35）乃至（S37）し、その後、実際のデジタルコピーを実施（S38）乃至（S44）して、コピー先の管理情報を更新（S45）乃至（S47）するようにしても上記同様の効果が得られるし、その他、種々の変形形態による実施が可能であることは明白である。

【0045】又、上記実施例では管理情報が記録されるTOC領域を有する記録媒体を用いた情報記録再生装置の例で説明したが、TOC領域を有さない記録媒体を用いるシステムにおいてはコピー元の情報、即ち上記実施例に適合させれば光磁気ディスク（1）の3曲目（AM、3）の情報そのものについて消去動作（例えば消音状態での情報を重ね記録する）を実施することにより、時間は所要するものの同様のデジタルコピーが可能とできるものである。

【0046】尚、上記実施例においてはCDフォーマットをベースにしたオーディオ情報の書き換え可能ディスク装置例を用いて説明したがそれに限定されるものではなく、他のフォーマットにおいても適用できることは勿論のこと、ディスク形態に限らずテープ形態であってもよいし、画像情報やコンピュータ用データを扱う装置においても、本発明の主旨を逸脱しない範囲で実施可能である。

【0047】

【発明の効果】以上のように本発明に係る情報記録再生装置は、デジタルコピーを禁止する情報が含まれた記録媒体を用いる情報記録再生装置であって、第1記録媒体上の所望情報を再生する再生手段と、再生手段の出力を第2記録媒体上の所望位置に記録する記録手段と、第1記録媒体から再生して第2記録媒体への記録が行われる情報に対応する第1記録媒体上の情報の抹消を行う抹消手段とを有することを特徴とする構成である。

【0048】従って、第1記録媒体から第2記録媒体への所望情報のデジタルコピーが品質劣化することなく実施できると共に、第1記録媒体上のコピー元情報の抹消動作が行われることにより同一情報が複数の記録媒体に存在することが防止され、著作権保護も行えるものであ*

*る。

【0049】又、抹消手段による抹消動作が完了するまでの間、第1記録媒体及び又は第2記録媒体の情報記録再生装置からの排出を禁止する手段を備えた構成とすることにより、ユーザの故意の不正なデジタルコピーを未然に防止することができ、著作権保有者（ソフト供給側）に安心感を与えるシステムとすることができる。

【0050】更に、上記第1記録媒体及び第2記録媒体としてはオーディオや画像等の主情報が記録される主情報領域と、各々の主情報毎の記録位置情報がデジタルコピーを禁止する情報と共に含まれる管理情報が記録される管理情報領域よりなる記録媒体を用いたシステムで適用することにより、コピー元情報の抹消動作が短時間で行えたと共に、ユーザの故意の操作も含めた情報記録再生装置の電源切断の場合においても、同一情報が複数の記録媒体に存在することが防止され、より安全な著作権保護を行うことができる情報記録再生装置を提供できる。

【0051】ユーザにとっては自分でマイク等を用いてアナログ録音したものは勿論のこと、SCMSに沿ってデジタルコピーを行った音楽情報についても、品質低下のないデジタルコピーが何回でも行え、任意の編集が可能な新規情報記録再生装置を提供できるものである。

【図面の簡単な説明】

【図1】情報記録再生装置のブロック図である。

【図2】光磁気ディスクの概略平面図である。

【図3】光磁気ディスクの拡大平面図である。

【図4】情報記録再生装置のデジタルコピー動作の制御流れを示すフローチャートである。

【図5】デジタルコピーを行う前後のディスク上の音楽情報配置を示す模式図である。

【図6】情報記録再生装置のデジタルコピー動作の制御流れを示すフローチャートの他の例である。

【図7】コンパクトディスクの概略平面図である。

【図8】コンパクトディスクのフレーム信号フォーマットを示す模式図である。

【図9】コンパクトディスクのセクタフォーマットを示す模式図である。

【符号の説明】

A, B ユニット

10 コントローラ

1, 22 光磁気ディスク

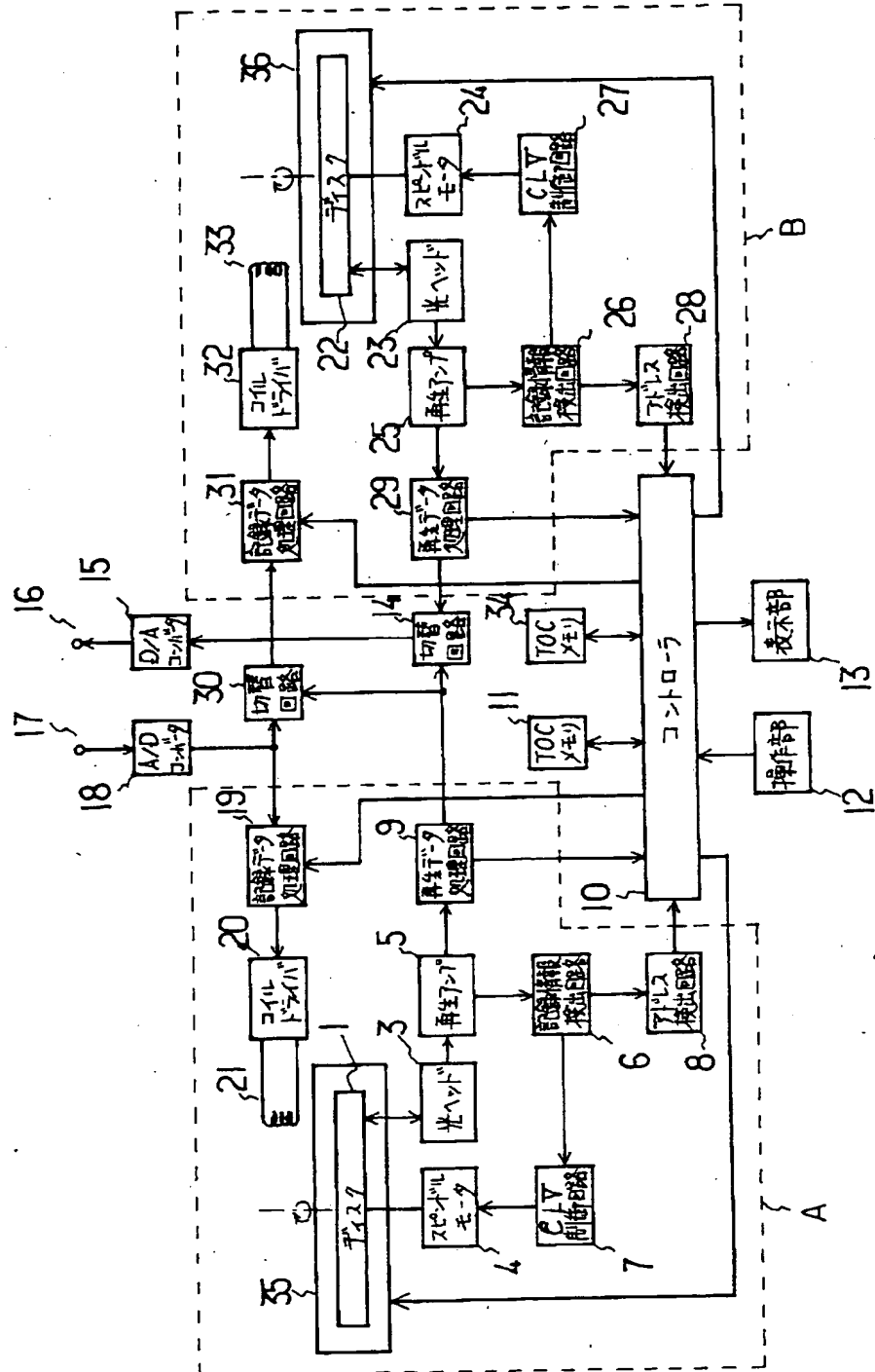
3, 23 光ヘッド

9, 29 再生データ処理回路

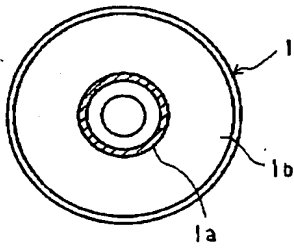
6, 26 記録情報検出回路

19, 31 記録データ処理回路

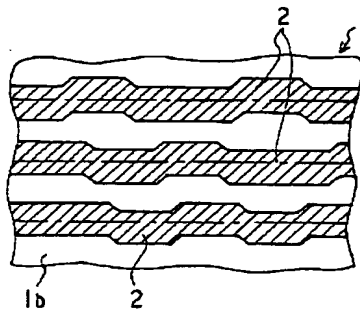
【図1】



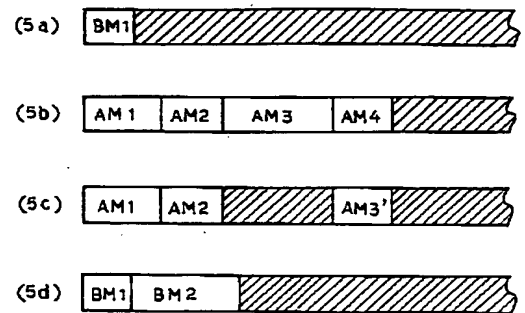
【図 2】



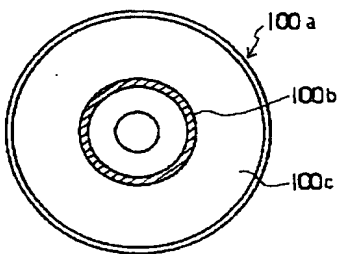
【図 3】



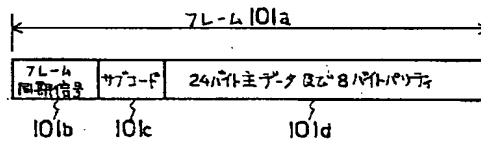
【図 5】



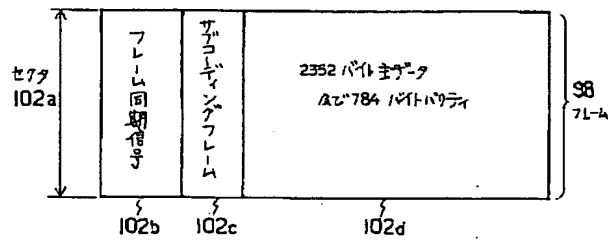
【図 7】



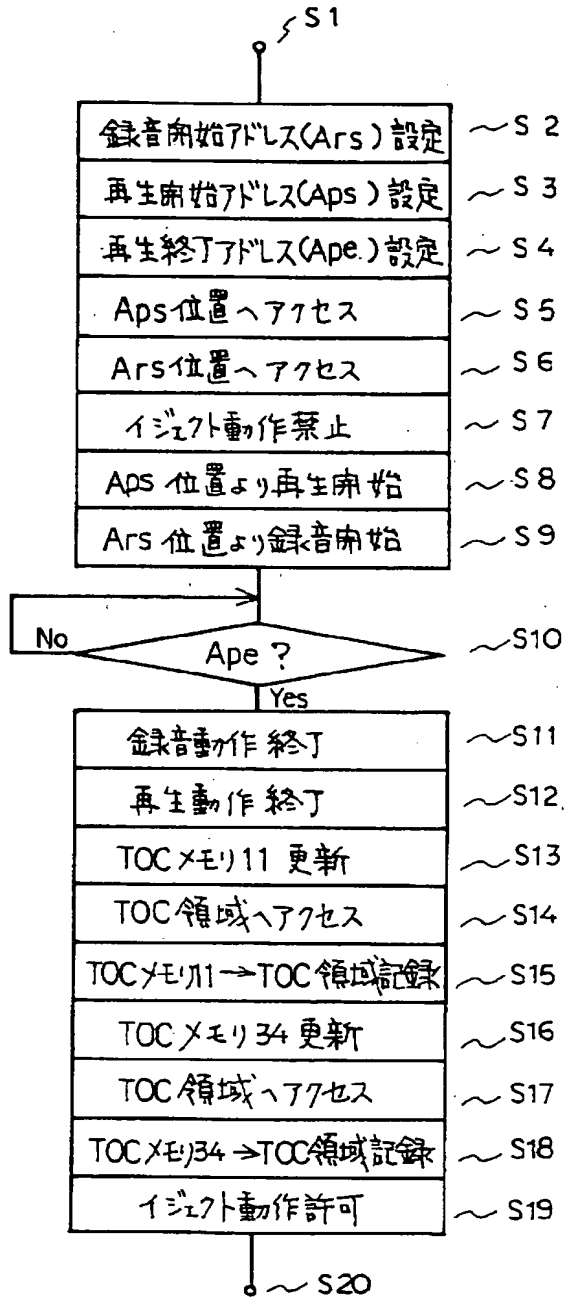
【図 8】



【図 9】



【図 4】



【図 6】

